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ABSTRACT

Mapping the cognitive style of individual learners is one attempt to gain more precision and accountability in solving learning problems in education. Cognitive Style Mapping is a diagnostic procedure. It is designed to determine how people derive meaning from the world around them, specifically how individuals encode, process and decode meanings. The Cognitive Style Map Instrument is primarily designed for edumetric uses rather than psychometric uses. It is designed to measure the gain or growth of an individual's knowledge, learning skills, or abilities, rather than measuring individual differences in relation to a group. The Cognitive Map Instrument can be modified to reflect learning skills and abilities for any of the roles a person plays (learner, teacher, administrator, parent, worker, leader, etc.). (RB)

MAXIMIZING INDIVIDUAL STUDENT LEARNING THROUGH COGNITIVE STYLE MAPPING

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The following represents a summary of discussion and materials used in a Short Course at the annual meeting of the Speech Communication Association held in Houston, Texas on December 29, 1975

COGNITIVE STYLE MAPPING

Introduction

The level of precision and accountability that is found in fields such as medicine and engineering, seems to have eluded education. Solutions and explanations tend to be expressed in terms of content or subject matter rather than in terms of factors affecting learning. Mapping the cognitive style of individual learners is one attempt to gain more precision and accountability in solving learning problems in education. This procedure was developed by Joe Hill and associates at Oakland Community College.

Cognitive Style Mapping is a diagnostic procedure. It is diagnostic in that it is designed to determine how a person derives meaning from the world around him, specifically how he encodes, processes and decodes meanings.

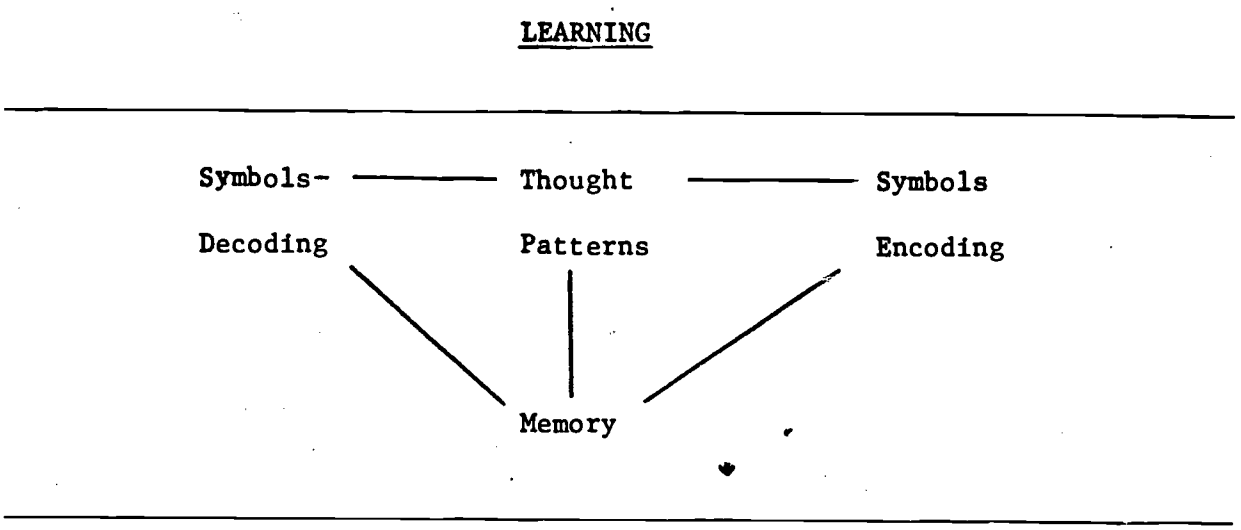
The Cognitive Style Map Instrument is primarily designed for edumetric uses rather than psychometric uses. It is designed to measure the gain or growth of an individual's knowledge,learning skills or abilities, (comparing him with himself) rather than measuring individual differences in relation to a group (comparing him to others.)

Because a person performs numerous roles in his daily life, it is probable that he has developed different skills and abilities to handle his differing roles, i.e. the skills and abilities a person employs as a learner may differ from those he employs when in the role of parent. The Cognitive Map Instrument can be modified to reflect learning skills and abilities for any of the roles a person plays (learner, teacher, administrator, parent, worker, leader, etc.) Thus the Cognitive map for a learner could be called a learning style map.

Overview

There are three methods of using the procedure. Empirical mapping observes what people do. An example of this type of mapping is a teacher observing the ways that students function in the classroom. Direct skills mapping involves recording people's behavior in planned situations or on nationally normed instruments. The third type of mapping is a Self-Report Inventory. This type of mapping asks people to describe the frequency of what they do. An underlying assumption of this approach is that people frequently do what they do best and avoid what they do poorly. A Self-Report Inventory Map is valid to the extent that a person knows and accurately reports himself. With all three types of mapping, as a person grows and changes his map will change. (Appendix C contains sample Self-Report Inventory items.)

Fig. 1, Model of learning implied by a Cognitive Map.



The Cognitive Map describes major, minor and negligible strengths in the following three areas: Symbol Uses, Interpersonal Environments and Thought Patterns. Figure 1 shows a model of learning implied by the Cognitive Map.

Every teaching method (book, lecture, cassette tape, communication game, etc.) has its own cognitive style. This cognitive style is known as the mode of response demanded by the task (MRDT). Increased learning efficiency occurs when there is at least 70 percent match between the (MRDT) and the student's learning style.

Often achievement cannot occur unless the student's cognitive style is improved. The process of working to improve a student's cognitive style is called augmentation. To augment learning styles (MRDT) should be partially mismatched with a student's preferred learning style as determined by his Cognitive Map.

In addition to maximizing learning some other uses of Cognitive Style Maps are:

-Gaining a composite picture of a group of students to determine optimal approach for group functioning

-Identifying students who learn well individually

-Setting up student study groups, projects and tutor systems

-Sequencing learning based on major, minor and negligible strengths

-Predicting student learning problems

-Advising students to course options which use their strengths for efficient learning

-Counselling students in career planning

-Helping teachers understand their own teaching style preferences

-Designating staff job and committee assignments (who works best at what tasks)

Interpreting A Cognitive Map

By knowing every symbol on the Cognitive Map, the type of behavior the symbol represents and the interrelations among symbols, the Map becomes a highly valuable tool in dealing with the learning of an individual.

The first set of a Cognitive Style Map symbols describes 'Qualitative' and 'Theoretical' as the two types of symbols used by learners when encoding and decoding data.

Theoretical symbols include the man made symbol systems of words and numbers and the learner's preferences in using these symbol systems in an oral or written manner. Examples of the use of a theoretical strength are the ability to acquire meaning through hearing the spoken word and the ability to solve oral mathematical problems.

Qualitative symbol usage includes describing skills in using 1. sensory stimuli; the ability to perceive meaning through hearing, smelling, tasting, touching and seeing, (awareness of visual communication) 2. programmatic effects; the ability to synthesize a number of symbolic stimuli into various actions, (sending appropriate non-verbal cues) 3. cultural codes; sensitivity to the feelings of others, ability to enjoy the beauty of an object or idea, (appreciating a well delivered speech.)

The second set of Cognitive Style Map identifies preferences in using three cultural determinants, which influence the meanings people attach to symbols. These three determinants are referred to as Interpersonal Environments on the Cognitive Map. They are: Individuality, Associates, and Family.

The Individuality influence can be reflected by a person's need to do it on his own "his way." He may show a preference for explaining situations or definitions in his own words and learning on his own.

The person who shows a strong Associates influence is one who best understands things after explaining or discussing them with his friends or peers. Group activities may be the most effective learning mode for this person.

The Family influence is evidenced in an individual who learns best through authority. Working directly with an instructor may be his best learning mode.

The third set includes the two types of Thought Patterns included on the Cognitive Map. These are induction and deduction. The symbols for these thought patterns are: Magnitude, Difference, Relationship, Appraisal, and Deductive.

Magnitude strength indicates a person who needs to define things in order to understand them. Difference strength indicates a person who learns through seeing how various things and ideas differ from the thing or idea being considered. Relationship strength is indicated by an individual who synthesizes a number of incidents into a unified meaning. He understands by seeing how other things or ideas relate to the thing or idea being considered. Appraisal strength indicates a person who uses all three of the patterns above with approximately equal weight. Deductive strength indicates a person who prefers logical proof as in the style of syllogistic reasoning.

While each symbol on the Cognitive Map is significant, it is important to note that in prescribing learning modes for a given student the inter-relationship of all three sets and of all symbols must be considered to develop a 'valid' representation of a person's strengths. Here are some examples of map elements needed for some specific learning tasks (MRDT.)

(a) Reading and writing tasks, to be accomplished by each student individually, according to prescribed rules which must be followed:

T(VL) (I) (M)
Q(CTM)
Q(CEM)
Q(CET)

(b) Teacher makes formal presentation, lecture with charts, blackboard:

T(AL) (F) (M)
T(VL) (R)
Q(V)
Q(CEM)

(c) Workgroup activity; "hands on material"; creative interaction:

T(AL) (A) (R)
Q(T) (D)
Q(V)
Q(CK)
Q(CP)
Q(CEM)

(d) Individual work at programmed text:

T(VL) (I) (M)
Q(CET) (R)
Q(CEM)
Q(CS)

APPENDIX A

Definition of Symbols

and

Adaptive Learning Modes

SYMBOL USES: The first set, Symbol Uses, reflects a person's abilities to decode and encode certain types of symbols in the learning process: (1) theoretical symbols (words and quantities) and (2) qualitative symbols (sensory data and qualitative cultural codes:)

Explanation of Map Elements	Person with major strength works well with:
Theoretical:	
T(AL) - Theoretical Auditory Linguistic ability to send or receive meaning through spoken words (e.g. listening and speaking).	Oral presentations and opportunities for oral response.
T(AQ) - Theoretical Auditory Quantitative ability to send or receive meaning in terms of spoken quantities, measurements, and numbers.	
T(VL) - Theoretical Visual Linguistic ability to send or receive meaning from written words (e.g. reading and writing).	Written presentation and opportunities for written response.
T(VQ) - Theoretical Visual Quantitative ability to send or receive meaning in terms of written quantities and measurements.	

QUALITATIVE SENSORY

Explanation of Map Elements	Person with major strength works well with:
Qualitative Sensory:	
Q(A) - Qualitative Auditory- ability to send or receive meaning through the sense of hearing.	Auditory materials of a non-theoretical type (sounds of things)
Q(C) - Qualitative Olfactory- ability to send or receive meaning through the sense of smell.	
Q(S) - Qualitative Savory- ability to send or receive meaning through the sense of taste.	"Hands-on" materials
Q(T) - Qualitative Tactile- ability to send or receive meaning through the sense of touch.	
Q(V) - Qualitative Visual- ability to send or receive meaning through the sense of sight.	Visual materials to facilitate understanding
Q(P) - Qualitative Proprioceptive- ability to control motor behavior to monitor sensory inputs and synthesize a number of symbolic steps into a performance of a complex task.	Projects requiring sensory relationships; would do muscular coordination tasks naturally and easily

Explanation of Map Elements

Qualitative Cultural Codes:	Person with Major Strength works well with:
Q(CEM)- Qualitative Code Empathetic- sensitivity to the feelings of others, ability to put yourself in the place of another and see things from that person's point of view.	Relating to goals and needs of teacher and peers; useful in role as student tutor.
Q(CES)-Qualitative Code Esthetic- ability to enjoy varied aspects of "beauty" (e.g. personal idea of beauty, orderliness, symmetry, balance).	Pleasant work environment; tasks which call for esthetic judgments.
Q(CET)-Qualitative Code Ethic- the holding of a consistent value system: willingness to stick to a task and complete it. ("protestant work ethic")	Self-discipline; tasks which require personal responsibility (if within personal value system)
Q(CH)- Qualitative Code Histrionic- ability to exhibit a deliberate behavior, to control your behavior to produce some particular effect on another person.	Situations which call for role playing
Q(CK)- Qualitative Code Kinesics- ability to understand others and communicate what you sincerely feel by nonverbal symbols such as facial expressions and body attitudes.	Situations which call for sensitivity to nonverbal communication (i.e. group work)
Q(CKH)-Qualitative Code Kinesthetic- ability to perform motor skills, in such a way that you emulate recommended form.	Would work to attain correct form in physical activity; equipment and physical materials would be handled
Q(CP)- Qualitative Code Proxemics- ability to behave appropriately regarding the physical and social distance that another person would permit, between himself and you.	Group work and other physical and personal relationships with others
Q(CS)- Qualitative Code Synoetics- personal understanding of oneself.	Tasks requiring self confidence; self-assessment of strengths
Q(CT)- Qualitative Code Transactional- ability to maintain a positive communicative interaction which significantly influences another.	Situations which call for interaction with others; could provide leadership in groups
Q(CTM)- Qualitative Code Temporal- ability to behave as other expect you to in time-related matters.	Preparing assignments on time; budgeting one's time; knowing when it is appropriate to enter a group, knowing when to begin and end a conversation

INTERPERSONAL RELATIONSHIPS:

The second set describes interpersonal relationships which are most used as a person learns. The three patterns that could potentially appear on a map as major, minor, or negligible strengths are:

Explanation of Map Elements	Person with major strength works well with:
A - indicates that a person generally relies on the interpretation of associates and can learn well in study groups or with another person.	A peer-type relationship with teacher or aide; class interaction; small group; tutor relationship
F - indicates that a person generally relies on a person in authority (e.g. family, teacher, etc.) and can learn well with a teacher.	Fairly directive guidance; lecture; directive tutoring can take both superior and subordinate role
I - indicates that a person generally relies on his own interpretation and can learn well on his own.	Individual tasks (not necessarily unstructured)

THOUGHT PATTERNS: The third set suggests the way an individual attaches meaning, reaches decision, or the characteristic way a person thinks. This would suggest an appropriate manner of organization for learning materials and communication.

Explanation of Map Elements	Person with major strength works well with:
M(Magnitude) -suggests a form of understanding by categorization; using rules and definitions. People with major "M's" tend to understand particular instances by inclusion into categories. Focuses on the essence of what is being studied.	Presentations and materials where specific rules and definitions are utilized and mastered; specific directions and requirements are preferred rather than open-ended tasks.
D(Difference) -suggests a tendency to think in terms of one-to-one contrasts or comparisons. A person using this mode of thinking often understands some things by understanding what it is not (that is, by citing exceptions) and is often characterized by his use of "What if..." or "Yes, but..."	Presentations and materials that provide opportunities to contrast qualities and ideas. Likes to provide another way to approaching a task.
R(Relationship) -suggests the ability to synthesize a number of dimensions and understand them by their relationship to other things, ideas or past experiences. People with major "R's" are adept at learning concepts through examples.	Presentations and materials that emphasize relationships, call for interconnection; often requires back-tracking into what he is already familiar with to create a connection with new materials.
L(Appraisal) -suggests the type of thinking that employs all of the above types; giving about equal weight in making a decision, usually results in a probable decision and takes longer to reach a decision or complete a project.	A variety of materials used to come to tentative conclusions; doesn't like to be pinned down to specific answers, open-ended tasks are preferred.
K(Deductive) -suggests deductive reasoning, using logical forms of proof from generalizations to particulars, looks for predictability and requires rules and definitions that assure the correct solution will occur by their utilization.	Concrete challenges which have definite solutions or results; adverse to problems where "maybe" is a factor. May be difficult to accommodate except in quantitative areas.

APPENDIX B

Sample Cognitive Maps

Explanation

--A learning style map has two parts. The top half of the map contains a visual display of major, minor, and negligible strengths in the areas of SYMBOL USES, INTERPERSONAL RELATIONSHIPS, and THOUGHT PATTERNS. The bottom half of the map contains a numerical specification of the strengths in terms of percentiles.

--The strength of the individual map elements on the learning style map can be interpreted as follows:

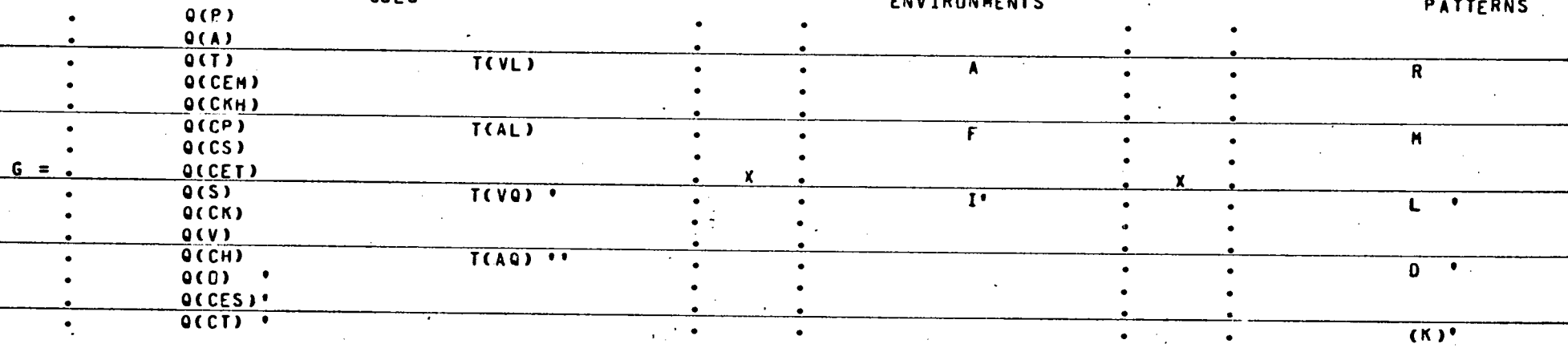
(1) The symbol may appear on the map as the abbreviation shown in these materials without any additional markings--this indicates a Major Strength which a person brings to the learning situation (50-99 percentile).

(2) The symbol may appear on a map with a prime (') beside it--this indicates a Minor Strength which a person brings to the learning situation (25-49 percentile).

(3) The symbol may appear on a map with a double prime ('') beside it--this indicates a Negligible Strength this suggests that a person does not use this factor as a significant approach in his learning (0-24 percentile).

LEARNING STYLE MAP

NAME: DATE:



ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE
1	T(AL)	60-69	10	Q(P)	90-99	19	Q(CT)	30-39
2	T(AQ)	10-19	11	Q(CEM)	60-69	20	A	50-59
3	T(VL)	70-79	12	Q(CES)	40-49	21	F	50-59
4	T(VQ)	30-39	13	Q(CET)	60-69	22	I	30-39
5	Q(A)	80-89	14	Q(CH)	50-59	23	O	30-39
6	Q(O)	40-49	15	Q(CK)	50-59	24	L	40-49
7	Q(S)	50-59	16	Q(CKH)	60-69	25	M	50-59
8	Q(T)	80-89	17	Q(CP)	60-69	26	R	60-69
9	Q(V)	50-59	18	Q(CS)	60-69	27	(K)	30-39

LEARNING STYLE MAP

NAME:

DATE:

	SYMBOL USES			INTERPERSONAL ENVIRONMENTS		THOUGHT PATTERNS
	Q(A)					
	Q(T)					D
	Q(CEM)	T(VQ)		F		
	Q(CET)					
	Q(P)					R
	Q(CES)	T(AL)		A		
	Q(CS)					
G =	Q(S)		X		X	L
	Q(V)	T(AQ)		I		
	Q(CP)					
	Q(CT)					(K)
	Q(O)	T(VL)				
	Q(CK)					
	Q(CKH)					M
	Q(CH)					

ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE
1	T(AL)	60-69	10	Q(P)	80-89	19	Q(CT)	70-79
2	T(AQ)	60-69	11	Q(CEM)	90-99	20	A	60-69
3	T(VL)	60-69	12	Q(CES)	80-89	21	F	80-89
4	T(VQ)	80-89	13	Q(CET)	90-99	22	I	60-69
5	Q(A)	90-99	14	Q(CH)	50-59	23	O	80-89
6	Q(O)	60-69	15	Q(CK)	60-69	24	L	60-69
7	Q(S)	80-89	16	Q(CKH)	60-69	25	M	50-59
8	Q(T)	90-99	17	Q(CP)	80-89	26	R	70-79
9	Q(V)	80-89	18	Q(CS)	80-89	27	(K)	60-69

LEARNING STYLE MAP

NAME: DATE:

G = Q(CT) Q(T) Q(P) Q(CK) Q(CS) Q(S) Q(CEM) Q(CET) Q(CP) Q(V) Q(CH) Q(CES) Q(A) * Q(CKH) * Q(O) **

SYMBOL USES: T(VL) T(AL) T(AQ) * T(VQ) *

X

INTERPERSONAL ENVIRONMENTS: I F* A**

X

THOUGHT PATTERNS: R L (K)* D * M *

ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE	ROW	ELEMENT	CENTILE
1	T(AL)	50-59	10	Q(P)	70-79	19	Q(CT)	80-89
2	T(AQ)	40-49	11	Q(CEM)	60-69	20	A	10-19
3	T(VL)	70-79	12	Q(CES)	50-59	21	F	20-29
4	T(VQ)	30-39	13	Q(CET)	60-69	22	I	90-99
5	Q(A)	40-49	14	Q(CH)	60-69	23	D	30-39
6	Q(O)	10-19	15	Q(CK)	70-79	24	L	50-59
7	Q(S)	60-69	16	Q(CKH)	40-49	25	M	30-39
8	Q(T)	70-79	17	Q(CP)	60-69	26	R	80-89
9	Q(V)	60-69	18	Q(CS)	70-79	27	(K)	40-49

APPENDIX C

Sample Cognitive Style Map Statements

COGNITIVE STYLE INSTRUMENT - ADULT FORM

INSTRUCTIONS:

1. Read each sentence below.
2. Decide if the sentence accurately describes you "Rarely," "Sometimes," or "Usually."
3. Notice the number and letter to the left of the sentence. The number refers to the row number on the Tally Sheet.
4. Go to the row number which matches the sentence number.
5. Place the letter of the sentence in the row under the appropriate column--(Rarely, Sometimes, Usually).
6. Please answer each statement. For some statements you may have to consider analogous situations so that they are most appropriate to you.
7. When you have completed the map, please check each row to see if you have responded to each of the eight sentences for the row. If you have, there will be eight letters across each row.

SAMPLE:

3C It is easier for me to explain things in writing than by talking about them.

2F I can remember a telephone number once I hear it.

TALLY SHEET

	Rarely	Sometimes	Usually
1.			
2.		F	
3.			C

In the lefthand sample above I read the statement, decided that it was true for me "Usually." I then went down to row '3' on the Tally Sheet and put the letter "C" under the "Usually" column. In the righthand sample, I read the statement, decided that it was true for me "Sometimes." I then went to row '2' on the Tally Sheet and put the letter 'F' in the "Sometimes" column.

SAMPLE ITEMS

I can make more sense out of what a person means when he speaks to me rather than if he writes to me.

1D

I score high on achievement tests which depend on reading comprehension.

3A

People say I speak more understandably than I write.

1A

I prefer classes which rely heavily on textbooks for information.

3B

I would rather communicate with friends by telephone than by writing messages to them.

1B

I take notes on lectures and use them later for study.

3C

When given a job to do, I prefer to do it myself.

23A

While considering the quality of my high school, I spend most of my time comparing it with high schools in my area.

24A

I prefer working in situations where standards and rules are stated explicitly.

26C

I make my own political choices.

23D

Characteristics for successful people are not the same as those for unsuccessful people.

24B

I prefer to study on my own.

23B

I do things my way even if this does not conform to the expectations of my family or friends.

23C

I would rather read instructions for a task than to be given them orally.

3D

In evaluating the performances of others, I find it helpful to determine how this performance differed from a previous performance.

24D

An outline-summary is more understandable to me than a long essay.

26A

In a conversation, I often find myself saying, "Yes, but..."

24C

In evaluating the performance of others, I judge them as good or bad.

26D

I work best in a structured situation.

26B

COGNITIVE STYLE MAPPING

TALLY SHEET

Please Print:

NAME _____ DATE _____

COURSE

INSTRUCTOR _____ S.S. # _____

NOS	RARELY	SOMETIMES	USUALLY	
1				
2				
3				
4				
5				
6				
7				
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